

Notice of Allowability

Application No.

09/884,581

Examiner

Richard Chang

Applicant(s)

LAROIA ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 08/31/2005.
2. ☒ The allowed claim(s) is/are 2-5, 7, 9-12, 15-19, 22-25 and 29-38, now renumbered as 1-28.
3. ☒ The drawings filed on 19 June 2001 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

DETAILED ACTION

Response to Amendment

1. Applicants' amendments and arguments, see amendment, filed on 8/31/2005, with respect to Claims 1-38 have been fully considered and are persuasive. The 35 U.S.C. 103 rejections have been withdrawn. None of the previously cited reference teaches the Claims 2-5, 7, 9-12, 15-19, 22-25 and 29-38.

Claims 1, 6, 8, 13-14, 20-21 and 26-28 had been canceled.

Allowable Subject Matter

2. Claims 2-5, 7, 9-12, 15-19, 22-25 and 29-38 are allowed.

Examiner's Statement of Reasons for Allowance

3. The following is an examiner's statement of reasons for allowance:

The prior art along or in combination fails to teach or make obvious the following limitations:

"an initial time and frequency offset estimator connected to said sampler and said receiver; and a frequency offset estimate refinement unit connected to said receiver, said sampler and said estimator, wherein a reference multitone synchronization signal is used by said estimator and said refinement device in calculating a time offset and a frequency offset of said multitone synchronization signal, said receiver utilizing said time offset and said frequency offset to

synchronize with said received OFDM signal, wherein said initial time and frequency offset estimator comprises: a plurality of smoothed time-domain correlation estimators for outputting a series of time offset estimate and correlation estimate pairs, each pair related to a frequency offset estimate; and a selector for selecting a selected time offset estimate and a selected initial frequency offset based in part upon the selection of the frequency offset estimate and time offset estimate that corresponds with the largest value of correlation estimate" as recited in the independent claims 2 and 29.

"means for obtaining a coarse time offset estimate of said received signal; means for sampling said received signal in a selected time interval to derive samples of said multitone synchronization signal; means for analyzing said samples with respect to a reference multitone synchronization signal to obtain, for each sample analyzed, a time offset, a frequency offset, and a signal energy; and means for selecting one of said analyzed samples with the greatest signal energy to yield a selected time offset estimate and a selected frequency offset estimate wherein said selected time offset estimate and said selected frequency offset estimate are used by said receiver in synchronizing with said received OFDM signal and means for passing said selected time offset estimate and said selected frequency offset estimate to said receiver for use by said receiver in synchronizing with said received OFDM signal" as recited in the independent claims 9 and 22.

"locating said synchronization signal within said OFDM signal; determining a time offset value of said synchronization signal; determining an initial frequency

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offset value of said synchronization signal; and recursively refining said frequency offset estimate to yield a selected pair of time and frequency offset values to be used by said OFDM receiver” as recited in the independent claims 10, 23 and 24.

“connected to said sampling means and said receiving means, for obtaining an initial time estimate and an initial frequency offset estimate of said OFDM signal; means, connected to said receiving means, said sampling means and said estimating means, for obtaining a frequency offset estimate refinement; and storage means, connected to said estimating means and said refinement means, for storing a reference multitone synchronization signal for use by said estimating means and said refinement means in calculating a time offset and a frequency offset of said multitone synchronization signal, said receiving means utilizing said time offset and said frequency offset to synchronize with said received OFDM signal, wherein said estimating means further comprises: a plurality of means for obtaining smoothed time-domain (TDC) correlation estimates, said smoothed TDC estimate means outputting a series of time offset estimate and correlation estimate pairs, each pair related to a frequency offset estimate; and means for selecting a selected time offset estimate and a selected initial frequency offset based in part upon the selection of the frequency offset estimate and time offset estimate that corresponds with the largest value of correlation estimate” as recited in the independent claim 15, and

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"transmitting an OFDM signal comprising a first time interval and a second time interval; means for transmitting data at one or more data frequencies during said first time interval; and means for transmitting, during said second time interval, a synchronization tone, at one or more synchronization frequencies, for a predetermined time period, the frequencies of said synchronization tone being distinct from said data frequencies" as recited in the independent claims 35 and 36.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Chang whose telephone number is (571) 272-3129. The examiner can normally be reached on Monday - Friday from 8 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on (571) 272-3139. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RKC

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Richard Chang
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PRIMARY EXAMINER